

Control and Traceability

in a Margarine Production Facility

Gerstenberg
Schröder

Traceability

Margarine, like other food products, is in many factories today produced under strict traceability procedures. In order to be able to react fast, food manufacturers need to be able to trace the origins of the ingredients in case of contaminations of these. The traceability procedures covering the ingredients, the production and the final product not only result in an enhanced food safety but also in a constant food quality since the raw materials have to meet distinct specifications and the products are manufactured and distributed under defined conditions.

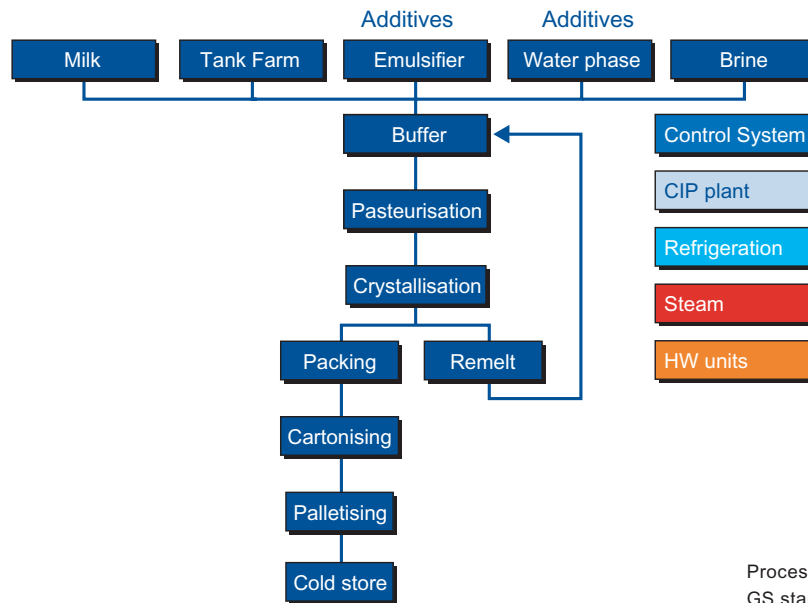


Traceability demands can easily be implemented in the control system of the factory. Apart from complete processing lines to the industry producing margarine and other crystallised fat products, Gerstenberg Schröder delivers the GS Logic system which is designed to control, record and document important parameters concerning the complete manufacturing process. The system helps to improve plant performance by creating a consistent processing environment. The GS Logic exists in three versions: GS Logic Basic, GS Logic Advanced and GS Logic Professional; the latter version includes a web-based recipe editor and a web-based report system with traceability for each component controlled by the system.

	GS Logic Basic	GS Logic Advanced	GS Logic Professional
Semi-automatic control of the process	•	•	•
Software controllers	•	•	•
ProfiBus or DeviceNet	•	•	•
30 recipes (stored in PLC)	•	•	
Full-automatic programmes for the process		•	•
SCADA system			•
Server PC with SQL Database			•
Historical data saved for 12 month			•
Web-based Recipe Editor			•
Web-based Report System			•
Modem service for the PLC	•	•	•

Quality control

Margarine and crystallised products like butter and spreads are characterised as water-in-oil (w/o) emulsions for which the water phase is finely dispersed in the continuous fat phase. The ingredients used for margarine production can be divided into water-soluble and fat-soluble ingredients and obviously the documentation is linked to these phases. The subsequent processing is divided into the following production steps: emulsion preparation, pasteurisation, crystallisation and filling or packing.



Process function areas in a GS standard margarine plant

All raw materials are subject to quality control when received and can only be used in production when it has been verified that they meet the specifications. E.g. the solid fat content (SFC) profile which describes the amounts of solids at given temperatures for a fat is typically checked when fats are delivered. Batch numbers of the individual ingredients can be registered in the specific margarine batch for traceability. The specific margarine production is recipe-controlled and the production is typically divided into several batches of the same recipe. Hereby, the final margarine product can be linked not only to the recipe but also to the individual batches of the product-related production.

When the emulsion is created in the premix tank by adding the melted emulsifier blend to the melted fats and oils and adding the water phase subsequently, flow meters or weight cells control and ensure that the correct amounts of the various ingredients are added. The control system registers and files these amounts for later reports along with the tank temperature of the incoming phases and final emulsion. The emulsion is pasteurised prior to processing mainly to guarantee destruction of any unwanted micro-organisms and of all pathogenic bacteria but the pasteurisation process also ensures a constant and stable inlet temperature that facilitates the later process control.



GS Logic is easy to operate and gives an excellent overview of the complete production line.

Historic data logging

The GS Logic system is equipped with a password system and features historic data logging of all temperatures, pressures, loads and speeds of the units involved in the margarine processing line including the capacity and output of the high pressure pump (litres/hour and back pressure), product temperatures (including pasteurisation process) during crystallisation, cooling temperatures (or cooling media pressures) of the scraped surface heat exchangers (SSHE), speed of the SSHE and the pin rotor machines, load of the motors running the high pressure pump, SSHE and the pin rotor machines.

Processing parameters for specific products are set in the recipe editor and these parameters depend on product type and recipe. If the process parameters during processing are out of limits, the system will send an alarm which has to be acknowledged manually by the operator and actions according to procedures can then be taken. All alarms are stored in a historic alarm system for later view. When the product leaves the production line in a suitably packed or filled form, it is apart from the product name typically marked with a date, time and batch identification number for later tracking. Quality control of the final product involving sensoric and analytical procedures follows after 1-7 days of storage (the length depends on the nature of the product) and the product is hereby ready for shipment.

Code	Name	Created Date	Modified Date	Modified By
90	Agitation Start	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
91	Agitation High	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
92	Agitation Low	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
93	Interval Agitation	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
94	Agitation Stop	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
95	Start Tank Heating	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
96	Stop Tank Heating	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
97	Temperature Check	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
98	Laboratory Check	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System
99	Time Delay	01.01.2004 12:00:00	01.01.2004 12:00:00	GK System

The complete history of all the production steps involved in manufacturing margarine and crystallised fat products is thus filed for the security of the producer and the end user, the consumer. Now the manufacturer has control of the ingredients involved in the production of the food, the process is fully controlled and the end product is marked for later trace. The GS Logic system offers the needed documentation of the process in order to identify and correct potential problems quickly. This not only helps to save money in the process by getting back on line rapidly, but also ensures product quality, consistency and security.

Please contact GS for further information.

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